ELITE Data communication module

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1   OVERVIEW

The data communication module can write simulation data to logfiles and can send data packages over a UDP network connection. A configuration file specifies the mode of operation as well as communication parameters. Most parameters can be modified on a configuration page at runtime.

The plugin can send data through multiple channels (up to five). Each channel is described in a configuration file section titled [PROTCOL_CHx] where "x" is the number of the channel. The communication settings and update rates can be independently specified for each channel.

The protocol "Version4" allows to send data over a UDP network connection to a SocketMan-Server recipient. This package includes a library and a sample receiver application built with MSVC to retrieve and display some of the available values. Please refer to the README.TXT and the ReceiverSample.cpp in the folder ELITE/COMM RECEIVER for more information.

At the same time data can be written in a logfile for post-flight analysis. The logfile can be automatically named with time-stamped filename by setting the "AutomaticNaming" flag. The update rates are calculated using the simulation time. If the simulation is in freeze mode no data values are sent.

The network communication can be disabled by setting the entry 'CommType' to None. The logfile feature can be disabled by not specifying a filename and disabling the automatic naming feature.

The protocol "Version3" is provided as a legacy for compatibility reasons. All new users please use the current version V4 described in chapter 2.

2   PROTOCOL V4

2.1   Logfile format V4

Item	Value	Unit	Int	Dec	size
0	Simulation Time Stamp	sec	5	2	8
	position and attitude				
1	Aircraft Latitude (WGS-84)	Deg	2	6	9
2	Aircraft Longitude (WGS-84)	deg	3	6	10
3	Aircraft Heading	deg	3	2	6
4	Aircraft Pitch Attitude	deg	3	2	6
5	Aircraft Roll Angle	deg	3	2	6
6	Yaw Angle Rate	deg/sec	3	2	6
7	Pitch Angle Rate	deg/sec	3	2	6
8	Roll Angle Rate	deg/sec	3	2	6
9	Aircraft Angle of Attack	deg	3	2	6
10	Aircraft Sideslip Angle	deg	3	2	6
11	Aircraft Flight Path Angle	deg	3	2	6
12	Normal (vertical) G-Load	G	2	2	5
13	Longitudinal acceleration (aircraft coordinate system)	G	1	2	4
14	Lateral acceleration (aircraft coordinate system)	G	1	2	4
15	Vertical acceleration (aerodynamic coordinate system)	m/s2	1	2	4
16	Longitudinal acceleration (aerodynamic coordinate system)	m/s2	1	2	4
17	Lateral acceleration (aerodynamic coordinate system)	m/s2	1	2	4
18	Aircraft altitude above MSL	ft	5	0	5
19	Aircraft altitude AGL	ft	5	0	5
20	Aircraft Ground Speed	kts	3	1	5
21	Aircraft True Airspeed	kts	3	1	5
22	Aircraft Magnetic Heading	deg	3	2	6
23	Aircraft True Heading	deg	3	2	6
24	Aircraft Magnetic Track Angle	deg	3	2	6
25	Aircraft True Track Angle	deg	3	2	6
	instruments & engine				
1	Aircraft Indicated Airspeed	kts	3	1	5
2	Aircraft Indicated Airspeed Rate	kts/sec	3	1	5
3	Aircraft Pressure Altitude (indicated on instrument)	ft	5	0	5
4	Aircraft Radar Altimeter Altitude (if indication)	ft	5	0	5
5	Aircraft Radar Altimeter Selected Altitude (if indication)	ft	5	0	5
6	Aircraft Vertical Speed	ft/min	6	0	6
7	Baro Setting, In of Hg (set on instrument)	In Hg	2	2	5
8	TBI (Turn Bank Indicator)	-1 .. +1	1	1	4
9	Flap Deflection (percent)	0-1	2	1	4
10	Flap Deflection Angle (degree)	deg	2	1	4

11	Flight Director (FD) Status	encoded	1	0	1
12	FD Pitch Command (Degs)	deg	2	2	5
13	FD Roll Command (Degs)	deg	2	2	5
14	Left prop rpm	rpm	4	0	4
15	Right prop rpm	rpm	4	0	4
16	Left prop mp	in hg	2	1	4
17	Right prop mp	in hg	2	1	4
18	Left prop EGT	% range	1	2	4
19	Right prop EGT	% range	1	2	4
20	Left prop CHT	% range	1	2	4
21	Right prop CHT	% range	1	2	4
22	Oil Temperature	% range	1	2	4
23	Oil Pressure	% range	1	2	4
	navigation instruments				
1	ILS Glideslope CDI from station tuned into NAV1	encoded	2	2	5
2	ILS Glideslope Validity on NAV 1	encoded	1	0	1
3	ILS Localizer CDI from station tuned into NAV1	dots	2	2	5
4	ILS Localizer Validity on NAV 1	encoded	1	0	1
5	OBS 2 From/To indication tuned to NAV2	encoded	1	0	1
6	VOR OBS Course Selector tuned to NAV2	deg	3	1	5
7	CDI2 VOR deviation indication tuned to NAV2	deg	2	1	4
8	NDB needle bearing to station tuned to ADF	deg	3	1	5
9	RMI VOR needle bearing tuned to NAV1/2	deg	3	1	5
10	RMI NAV1/2 selector	encoded	1	0	1
11	DME - Distance from station tuned into DME	nm	3	1	5
12	Active Frequency on NAV1	Mhz	3	2	6
13	Standby Frequency on NAV1	Mhz	3	2	6
14	NAV1 status	encoded	1	0	1
15	Active Frequency on NAV2	Mhz	3	2	6
16	Standby Frequency on NAV2	Mhz	3	2	6
17	NAV2 status	encoded	1	0	1
18	Active Frequency on COMM1	Mhz	3	2	6
19	Standby Frequency on COMM1	Mhz	3	2	6
20	Active Frequency on COMM2	Mhz	3	2	6
21	Standby Frequency on COMM2	Mhz	3	2	6
22	Active Frequency on DME	Mhz	3	2	6
23	Active Frequency on ADF	Mhz	3	2	6
24	Marker indication	encoded	1	0	1
25	transponder code	number	4	0	4
26	Event marker on yoke (squawk)	encoded	1	0	1
	pilot input				
1	Pilot's Longitudinal input (pitch)	-99 to 99	3	0	3
2	Pilot's Lateral Input (rudder)	-99 to 99	3	0	3
3	Pilot's Directional Input (roll)	-99 to 99	3	0	3
4	Pilot's Left Brake Input	0 to 99	2	1	4
5	Pilot's Right Brake Input	0 to 99	2	1	4
6	Pilot's Left Throttle Input	0 to 99	2	1	4
7	Left engine mixture input	0 to 99	2	1	4
8	Left prop rpm input	0 to 99	2	1	4

9	Pilot's Right Throttle Input	0 to 99	2	1	4
10	Right engine mixture input	0 to 99	2	1	4
11	Right prop rpm input	0 to 99	2	1	4
12	Flap Deflection input	deg	2	1	4
13	Elevator trim activation on the yoke	encoded	1	0	1
14	Landing gear selector	encoded	1	0	1
15	Cowl flap selector (1)	0 - 1	2	0	2
16	Cowl flap selector (2)	0 - 1	2	0	2
	environment & failures				
1	Prevailing Wind Direction at Aircraft Altitude	deg	3	0	3
2	Prevailing Wind Magnitude at Aircraft Altitude	kts	3	1	5
3	Outside visibility as reported at present location	nm	2	1	4
4	Lowest cloud layer as reported at present location	ft msl	5	0	5
5	Lowest cloud layer coverage at location	1/8	1	0	1
6	Prevailing turbulence level	0-12	2	1	4
7	failed instruments	encoded	6	0	6
8	failed systems	encoded	5	0	5
9	failed gear flaps	encoded	2	0	2
10	failed nav receivers	encoded	10	0	10
11	failed engine	encoded	10	0	10

Encoded values:

Item	Descr.	size	syntax
	Flight Director	1	0=off, 1=on
	ILS Glideslope CDI NAV1	5	Float from –1 (full below deflection too low) to +1 (full deflection too high)
	Glideslope Valid Nav 1	1	1 valid, 0 invalid
	Localizer Validity Nav 1	1	1 valid, 0 invalid
	Elevator Trim activation	1	0 neutral, -1 trim down, +1 trim up
	Landing gear selector	1	0 down, 1 up
	Squawk	1	0 off, 1 pressed
	OBS2 From/To	1	0 from, to 1, off 2
	RMI NAV1/2 selector	1	1=select NAV1, 2=select NAV2
	NAV1 status	1	0=off, 1=on, 2=ident selected
	NAV2 status	1	0=off, 1=on, 2=ident selected
	Marker indication	1	0=no signal, 1=inner, 2=outer, 3=middle
	failed instruments	6	byte encoded: 100010 indicates failed AI,ASI
	failed systems	5	byte encoded: 00100 indicates pitot freeze
	failed gear flaps	2	byte encoded: 01 indicates flaps failure
	failed nav receivers	10	byte encoded: 0010000000 indicates Nav1 glide slope failure
	failed engine	10	byte encoded: 000000100 indicates right engine oil pressure loss

```
eInstrFailures {kFAIL_AI,        // attitude indicator
                kFAIL_DG,        // directional gyro
                kFAIL_VSI,       // vertical speed indicator
                kFAIL_ALT,       // altitude indicator
                kFAIL_ASI,       // airspeed indicator
                kFAIL_TC };      // turn coordinator
```

```
eSysFailures {kFAIL_VAC,                  // vacuum system
             kFAIL_STATIC,                // static system
             kFAIL_PITOT_FR,              // pitot tube freeze (ram air only)
             kFAIL_PITOT_FR_ALL,          // pitot tube and static port freeze
             kFAIL_ELEC };                // electric system
eNavFailures {kFAIL_NAV1REC,              // nav 1 receiver
             kFAIL_NAV1CDI,               // nav 1 CDI
             kFAIL_NAV1GS,                // nav 1 GS
             kFAIL_NAV2REC,               // nav 2 receiver
             kFAIL_NAV2CDI,               // nav 2 CDI
             kFAIL_NAV2GS,                // nav 2 GS
             kFAIL_DME,                   // DME
             kFAIL_NAVADFREC,             // ADF receiver
             kFAIL_ADFANTENNA,            // ADF antenna
             kFAIL_XPR };                 // transponder
eGearFlapFailures { kFAIL_GEAR,           // gear
                    kFAIL_FLAPS };        // flaps
eEngineFailures {  kFAIL_LENG,            // left engine total
                   kFAIL_LENG_POWERLOSS,  // left engine power loss
                   kFAIL_LENG_OILPRESS,   // left engine oil pressure
                   kFAIL_LENG_OILTEMP,    // left engine oil temperature
                   kFAIL_LENG_CYLTEMP,    // left engine cylinder head temp.
                   kFAIL_RENG,            // right engine total
                   kFAIL_RENG_POWERLOSS,  // right engine power loss
                   kFAIL_RENG_OILPRESS,   // right engine oil pressure
                   kFAIL_RENG_OILTEMP,    // right engine oil temperature
                   kFAIL_RENG_CYLTEMP };  // right engine cylinder head temp.
```

Comments:

- localizer full CDI deflection is 5 dots and typ. 2.5 degrees

- glideslope full CDI deflection is typ. 0.7 degrees

2.2   Data record V4

```
enum eInstrFailures { kFAIL_AI, kFAIL_DG, kFAIL_VSI, kFAIL_ALT, kFAIL_ASI, kFAIL_TC };
enum eSysFailures { kFAIL_VAC, kFAIL_STATIC, kFAIL_PITOT_FR, kFAIL_PITOT_FR_ALL,
                    kFAIL_ELEC };
enum eNavFailures { kFAIL_NAV1REC, kFAIL_NAV1CDI, kFAIL_NAV1GS,
                    kFAIL_NAV2REC, kFAIL_NAV2CDI, kFAIL_NAV2GS,
                    kFAIL_DME, kFAIL_NAVADFREC, kFAIL_ADFANTENNA,FAIL_XPR };
enum eGearFlapFailures { kFAIL_GEAR, kFAIL_FLAPS };
enum eEngineFailures { kFAIL_LENG, kFAIL_LENG_POWERLOSS, kFAIL_LENG_OILPRESS,
                       kFAIL_LENG_OILTEMP,kFAIL_LENG_CYLTEMP,
                       kFAIL_RENG, kFAIL_RENG_POWERLOSS, kFAIL_RENG_OILPRESS,
                       kFAIL_RENG_OILTEMP,kFAIL_RENG_CYLTEMP };

 int     fUpdateCounter;  // update counter

 // position, attitude, acceleration
 double  Latitude;          // Aircraft Latitude (WGS-84) [deg]
 double  Longitude;         // Aircraft Longitude (WGS-84) [deg]
 float   Hdg;               // Aircraft true Heading [deg]
 float   Pitch;             // Aircraft Pitch Attitude [deg]
 float   Roll;              // Aircraft Roll Angle [deg]
 float   YawRate;           // yaw change rate [deg/sec]
 float   PitchRate;         // Pitch Angle Rate [deg/sec]
 float   RollRate;          // Roll Angle Rate [deg/sec]
 float   Alpha;             // Aircraft Angle of Attack [deg]
 float   Beta;              // Aircraft Sideslip Angle [deg]
 float   Gamma;             // Aircraft Flight Path Angle [deg]

// aircraft accelerations, both in the aircraft and in the aerodynamic coordinate
// system
 float   fGLoad;            // Normal (vertical) G-Load [9.81 m/s^2 or g]
 float   fLongAcc;          // longitudinal acceleration [9.81 m/s^2 or g]
                            // (in the aircraft coordinate system)
 float   fLatAcc;           // lateral acceleration [9.81 m/s^2 or g]
                            // (in the aircraft coordinate system)
 float   fAeroVerticalAcc;// vertical acceleration [m/s^2]
                            // (in the aerodynamic coordinate system)
 float   fAeroLongAcc;      // longitudinal acceleration [m/s^2 ]
                            // (in the aerodynamic coordinate system)
 float   fAeroLatAcc;       // lateral acceleration [m/s^2]
                            // (in the aerodynamic coordinate system)
 float   AltMSL;            // Aircraft altitude above MSL [ft]
 float   AltAGL;            // Aircraft altitude above AGL at current location [ft]
 float   GroundSpeed;       // Aircraft Ground Speed [kts]
 float   TAS;               // Aircraft True Airspeed [kts]
 float   MagHdg;            // Aircraft Magnetic Heading [deg]
 float   TrueHdg;           // Aircraft True Heading [deg]
 float   MagTrack;          // Aircraft Magnetic Track Angle [deg]
 float   TrueTrack;         // Aircraft True Track Angle [deg]
```

```
// instruments & engine
float   IAS;            // Aircraft Indicated Airspeed [kts]
float   DIAS;           // Aircraft Indicated Airspeed Change Rate [kts/sec]
float   PressAlt;       // Aircraft Pressure Altitude (as indicated on instrument)
                            [ft]
float   RadarAlt;       // Aircraft Radar Altimeter Indicated Altitude (if
                            installed) [ft]
float   RadarSelect;    // Aircraft Radar Altimeter Selected Altitude (if installed)
                            [ft]
float   VS;             // Aircraft Vertical Speed [ft/min]
float   QNH;            // Baro Setting, In of Hg (as set on ALT instrument) [in hg]
float   TBIPosition;    // Position of the Turn/Bank indicator [–1 .. +1]
float   FlapDeflection; // Flap Deflection [deg]
float   FDState;        // Flight Director (FD) Status [encoded]: 0=off,1=on
float   FDPitch;        // FD Pitch Command (Degs) [deg]
float   FDRoll;         // FD Roll Command (Degs) [deg]
float   LeftRPM;        // actual left RPM [in /min]
float   RightRPM;       // actual right RPM [in /min]
float   LeftMP;         // actual left RPM [in hg]
float   RightMP;        // actual right RPM [in hg]
float   LeftEGT;        // left engine exhaust gas temperature [°F]
float   RightEGT;       // right engine exhaust gas temperature [°F]
float   LeftCHT;        // left engine cylinder head temperature [°F]
float   RightCHT;       // right engine cylinder head temperature [°F]
float   OilTemperature; // oil temperature [°F]
float   OilPressure;    // oil pressure [?]

// navigation instruments
float   GSDeviation;    // ILS Glideslope CDI from station tuned into NAV1 [deg]
float   GSValid;        // Glideslope Validity on Nav1 [encoded]: 0 invalid, 1 valid
float   LocDeviation;   // ILS Localizer CDI from station tuned into NAV1 [deg]
float   LocValid;       // ILS Localizer Validity on Nav1[encoded]: 0 invalid, 1
                            valid
float   OBS2FromTo;     // OBS 2 From/To indication tuned to NAV2 [encoded]:  from
                             0, to 1, 2 off
float   CDI2Select;     // VOR OBS Course Selector tuned to NAV2 [deg]
float   CDI2;           // CDI2 VOR deviation indication tuned to NAV2 [deg]
float   NDB;            // NDB needle bearing to station tuned to ADF [deg]
float   RMIVOR;         // RMI VOR needle bearing tuned to NAV1/2 [deg]
int     RMI_nav1_nav2;  // RMI NAV1/2 selector: 1=select NAV1, 2=select NAV2
float   DME;            // DME – Distance from Nav Device [nm]
float   Nav1_active;    // Active Frequency on NAV1 [Mhz]
float   Nav1_stby ;     // Standby Frequency on NAV1 [Mhz]
int     Nav1_status;    // NAV1 status: 0=off, 1=on, 2=ident selected
float   Nav2_active;    // Active Frequency on NAV2 [Mhz]
float   Nav2_stby ;     // Standby Frequency on NAV2 [Mhz]
int     Nav2_status;    // NAV2 status: 0=off, 1=on, 2=ident selected
float   Com1_active;    // Active Frequency on COM1 [Mhz]
float   Com1_stby ;     // Standby Frequency on COM1 [Mhz]
float   Com2_active;    // Active Frequency on COM2 [Mhz]
float   Com2_stby ;     // Standby Frequency on COM2 [Mhz]
float   DME_freq;       // Active frequency on DME [Mhz]
float   ADF_freq;       // Active frequency on ADF [Khz]
int     Marker;         // Marker indication: 0=no signal, 1=inner, 2=outer,
                             3=middle
int     SquawkCode;     // transponder code
```

```
float   Squawk;            // Event marker activation on yoke (squawk) [encoded]: 0
                              off, 1 click

// pilot input
float   LongInput;        // Pilot's Longitudinal input [-1 to 1]
float   LatInput;         // Pilot's Lateral Input [-1 to 1]
float   DirInput;         // Pilot's Directional Input [-1 to 1]
float   PilotLeftBrake;   // Pilot's Left Brake Input [0 to 1]
float   PilotRightBrake;  // Pilot's Right Brake Input [0 to 1]
float   PilotLeftThrottle;  // Pilot's Left Throttle Input [0 to 1]
float   PilotLeftMix;     // Pilot's Left engine mixture input [0 to 1]
float   PilotLeftRPM;     // Pilot's Left prop rpm input [0 to 1]
float   PilotRightThrottle;// Pilot's Right Throttle Input [0 to 1]
float   PilotRightMix;    // Pilot's Right engine mixture input [0 to 1]
float   PilotRightRPM;    // Pilot's Right prop rpm input [0 to 1]
float   FlapPos;          // Flap deflection input [deg]
float   ElevTrim;         // Elevator trim activation on the yoke [encoded]:
                          // -1 trim down; 0 no trim input; +1 trim up
float   Gear;             // Landing gear selector [encoded]:  0=down, 1=up
float   CowlFlaps1;       // Cowl flap selector (1) [0 to 1]
float   CowlFlaps2;       // Cowl flap selector (2) [0 to 1]

// environment & failures
float   WindDirection;    // Prevailing Wind (true) Direction at Aircraft Altitude
                             [deg]
float   WindMagnitude;    // Prevailing Wind Magnitude at Aircraft Altitude [kts]
float   Visibility;       // Outside visibility as reported at present loc [nm]
float   CloudCeiling;     // Lowest cloud layer base as reported at present loc [ft]
float   CloudCoverage;    // Lowest cloud layer coverage as reported at loc [1/8]
float   Turbulence;       // Current turbulence level [0 .. 12]

int     FailedInstruments; // Instrument failures, bit encoded, use enum
                              eInstrFailures
int     FailedSystems;     // System failures, bit encoded, use enum eSysFailures
int     FailedGearFlaps;  // GearFlaps failures, bit encoded, use enum eNavFailures
int     FailedNav;         // Nav failures, bit encoded, use enum eGearFlapFailures
int     FailedEngine;     // Engine failures, bit encoded, use enum eEngineFailures
```

2.3   Sample Logfile V4

```
ELITE comm logfile V4 V 4.1.0, May. 26th 2003.
TIMESTMP        LAT          LON  ACHDG  PITCH   ROLL   YRATE  PRATE  RRATE  ALPHA   BETA  GAMMA  GLOD LGACC
  59.245 47.465838   8.550200 210.04  22.61  25.30    4.94   1.99  -0.00   9.34   0.00  16.76  1.62 -0.24
  59.286 47.465828   8.550193 210.18  22.66  25.30    4.74   1.57  -0.00   9.24   0.00  16.89  1.60 -0.24


LTACC AVTAC ALGAC ALTAC   MSL    AGL    GS    TAS   MHDG    THDG MTRACK TTRACK   IAS   IASR PRESS   RALT
0.00   7.52 -2.25  3.87  1833   1833 114.5  119.2 209.54  210.04 206.31 206.81 117.2  -5.8  1834    0      0
0.00   7.36 -2.21  3.87  1835   1835 114.1  119.1 209.68  210.18 206.68 207.18 117.1  -3.1  1836    0      0


RALTS    VS    QNH   TBI FLPD FLPA S FDPIT FDROL LRPM RRPM   LMP   RMP LEGT REGT LCHT RCHT LOLT ROLT LOLP
3491      0      0 29.92  0.3  0.0  0.0 0    0.0   0.0 2748 2744  26.4 26.4 0.00 0.00 0.66 0.67 0.59 0.57
3508      0      0 29.92  0.3  0.0  0.0 0    0.0   0.0 2748 2744  26.4 26.4 0.00 0.00 0.66 0.67 0.59 0.57


ROLP  ILSGS1 ILSLOC1 O OBSSL CDI2   NDB   VOR N   DME NAV1AC NAV1SY S NAV2AC NAV2SY S COM1AC COM1SY
0.4   0.5  -1.00 1  0.00 1 2    0.0   0.0 270.0   90.0 2 -99.0 108.00 108.00 1 108.00 108.00 1 118.00 118.00
0.4   0.5  -1.00 1  0.00 1 2    0.0   0.0 270.0   90.0 2 -99.0 108.00 108.00 1 108.00 108.00 1 118.00 118.00


COM2AC COM2SY  DMEAC   ADFAC M SQAK S LON LAT DIR   LB    RB   LT   LM   LR   RT   RM   RR FLPP T G C1 C2
118.00 118.00 108.00 350.00 0 7171 0 -15   0   0  0.0   0.0 99.0 99.0 99.0 99.0 99.0 99.0  0.0 0 1  0  0
118.00 118.00 108.00 350.00 0 7171 0 -22   0   0  0.0   0.0 99.0 99.0 99.0 99.0 99.0 99.0  0.0 0 1  0  0


WND WNDMA   VIS  CEIL C  TURB INFAIL SFAIL   NAVFAIL GF ENGINEFAIL
  0   0.0 27.0 10000 4   0.0      0     0        0  0          0
  0   0.0 27.0 10000 4   0.0      0     0        0  0          0
```

3 CONFIGURATION AND USER INTERFACE

3.1 Configuration file

Location: (Elite Pilot)/Init/DataComm.ini

The configuration file consists of various entries, each of these entries defines and enables one output channel. Every entry starts with [PROTOCOL_CHx] where "x" is an integer starting at 1 that is incremented for each entry. The entries are interpreted starting at [PROTCOL_CH1], next are [PROTOCOL_CH2], [PROTOCOL_CH3] and so forth. The first missing number stops the configuration file parser.

Entry syntax:

```
[PROTOCOL_CHx]
DataType = string
CommType = string
IP = ip address
Port = integer
SyncRate = float
LogSyncRate = float
Logfile = string
AutomaticNaming = flag
```

- **DataType**: must be one of the following

    o "Version4": the current, most powerful output version

    o "Version3": last version, for compatibility reasons

    o "VersionSVV": Synthetic Vision output module

- **ComType** : must be 'EthernetClient' or 'None'

- **Port**: the socket-port Elite sends data records to

- **IP**: the IP address Elite sends data records to

- **SyncRate**: updaterate in seconds of the socket-communication

- **LogSyncRate**: updaterate in seconds of the logfile output

- **Logfile**: name of the logfile to be created (located in the ELITE main folder)

- **AutomaticNaming**: If set to 1 the name of the logfile is automatically created and includes the date and time of the application start (e.g. "EliteLog_10_26_2001__18_43.log" – recorded on Oct. 26th 2001, 18:43 local time) The default value is 0 – the application uses the specified filename
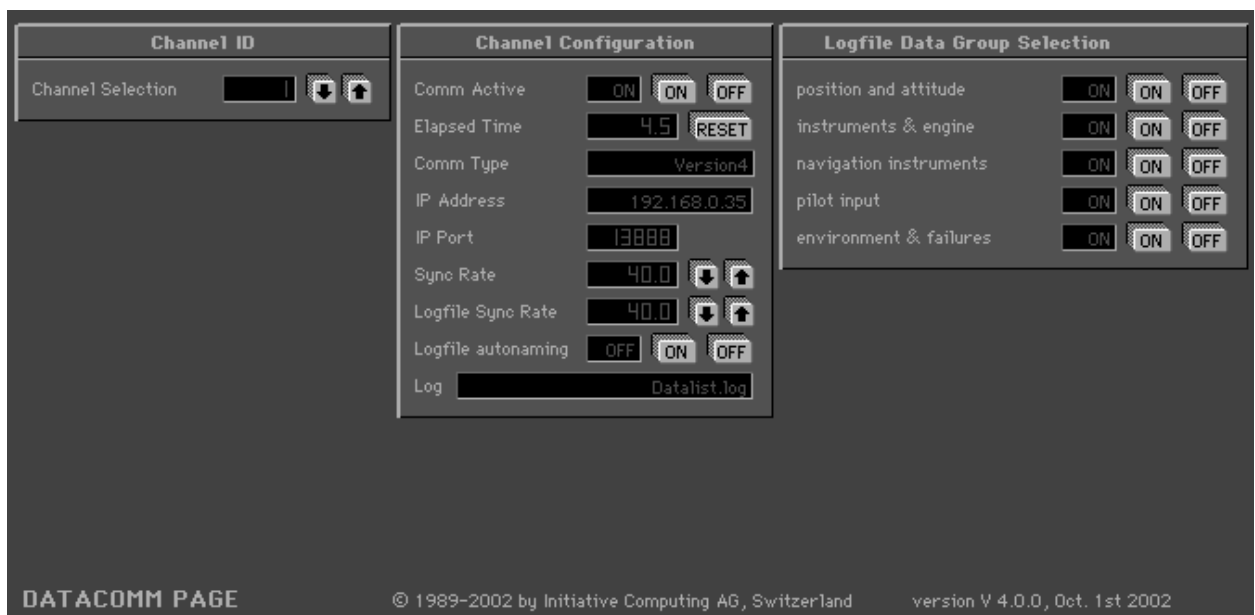
Samples:

```
[PROTOCOL_CH1]
DataType = Version4
CommType = EthernetClient
IP = 192.168.0.35
Port = 13667
SyncRate = 0.017
LogSyncRate = 0.017
Logfile = DataList1.log
```

or

```
[PROTOCOL_CH2]
DataType = Version4
CommType = None
IP = 192.168.0.11
Port = 13668
SyncRate = 1.0
LogSyncRate = 1.0
AutomaticNaming = 1
```

3.2   Configuration Page

The datacomm configuration page displays information about the output configuration and allows the user to change some parameters. You can display the datacomm configuration page by selecting "DATACOMM" in the page menu or by pressing "**Alt-A**".

- Tab "**Channel ID**":

  o **Channel Selection**: selects the channel to be displayed on the configuration page.

- Tab "**Channel Configuration**":

  o **Comm Active**: Shows if the current channel is enabled or not and allows the user to enable or disable the channel. Channels can also be enabled with the function keys F9,F10,F11,F12 (see chapter 1).

  o **Elapsed Time**: Shows the elapsed simulation time as listed in the first column of the logfile. The elapsed time can be reset to zero by pressing the RESET button.

  o **Comm Type**: shows the protocol version of the current channel

- o **IP Address**: shows the local IP address (only applicable if network communication is enabled)

- o **IP Port**: shows the local UDP Port (only applicable if network communication is enabled)

- o **Sync Rate**: Shows the update rate for the network communication in Hz. The frequency can be changed dynamically and is stored in the configuration file when ELITE is terminated.

- o **Logfile Sync Rate**: Shows the update rate for the logfile output in Hz. The frequency can be changed dynamically and is stored in the configuration file when ELITE is terminated.

- o **Logfile autonaming**: shows the current parameter taken from the configuration file.

- o **Log**: shows the currently used logfile (if applicable)

- **Tab Logfile Data Group Selection**:

   To limit the data output volume of the logfile, the ouput is subdivided into five groups:
   ```
   o   position and attitude
   o   instruments and engine
   o   navigation instruments
   o   pilot input
   o   environment and failures
   ```

   These groups can be activated and deactivated individually by pressing the corresponding ON/OFF buttons on the panel. The changes immediately affect the current logfile and are stored in the configuration file.

- **Keyboard Commands:**

   To control the communication additional keyboard commands have been defined:

   F9   communication on PROTOCOL_CH1 is ON

   F10   communication on PROTOCOL_CH1 is OFF

   F11   communication on PROTOCOL_CH2 is ON

   F12   communication on PROTOCOL_CH2 is OFF

4   PROTOCOL V3

This protocol is provided as a legacy for compatibility reasons. All new users please use the current version V4 described in chapter 2.

4.1   Logfile format V3

Item	Value	Unit	Int	Dec	size
0	Simulation Time Stamp	sec	5	2	8
1	Aircraft Angle of Attack	deg	3	2	6
2	Aircraft Sideslip Angle	deg	3	2	6
3	Aircraft Flight Path Angle	deg	3	2	6
4	Aircraft Heading	deg	3	2	6
5	Aircraft Pitch Attitude	deg	3	2	6
6	Aircraft Roll Angle	deg	3	2	6
7	Yaw Angle Rate	deg/sec	3	2	6
8	Pitch Angle Rate	deg/sec	3	2	6
9	Roll Angle Rate	deg/sec	3	2	6
10	Aircraft Magnetic Heading	deg	3	2	6
11	Aircraft True Heading	deg	3	2	6
12	Aircraft Magnetic Track Angle	deg	3	2	6
13	Aircraft True Track Angle	deg	3	2	6
14	Aircraft Latitude (WGS-84)	Deg	2	6	9
15	Aircraft Longitude (WGS-84)	deg	3	6	10
16	Aircraft altitude above MSL	ft	5	0	5
17	Aircraft altitude AGL	ft	5	0	5
18	Aircraft Ground Speed	kts	3	1	5
19	Aircraft Indicated Airspeed	kts	3	1	5
20	Aircraft Indicated Airspeed Rate	kts/sec	3	1	5
21	Aircraft True Airspeed	kts	3	1	5
22	Aircraft Vertical Speed	ft/min	6	0	6
23	Aircraft Pressure Altitude (indicated on instrument)	ft	5	0	5
24	Aircraft Radio Altimeter Altitude (if indication)	ft	5	0	5
25	Aircraft Longitudinal acceleration along flight path	G	1	2	4
26	Normal (vertical) G-Load	G	2	2	5
27	Flight Director (FD) Status	encoded	1	0	1
28	FD Pitch Command (Degs)	deg	2	2	5
29	FD Roll Command (Degs)	deg	2	2	5
30	DME - Distance from station tuned into DME	nm	3	1	5
31	ILS Glideslope CDI from station tuned into NAV1	encoded	2	2	5
32	ILS Glideslope Validity on NAV 1	encoded	1	0	1
33	ILS Localizer CDI from station tuned into NAV1	dots	2	2	5

34	ILS Localizer Validity on NAV 1	encoded	1	0	1
35	Baro Setting, In of Hg (set on instrument)	In Hg	2	2	5
36	Prevailing Wind Direction at Aircraft Altitude	deg	3	0	3
37	Prevailing Wind Magnitude at Aircraft Altitude	kts	3	1	5
38	Pilot's Longitudinal input (pitch)	-99 to 99	3	0	3
39	Pilot's Lateral Input (rudder)	-99 to 99	3	0	3
40	Pilot's Directional Input (roll)	-99 to 99	3	0	3
41	Pilot's Left Brake Input	0 to 99	2	1	4
42	Pilot's Right Brake Input	0 to 99	2	1	4
43	Pilot's Left Throttle Input	0 to 99	2	1	4
44	Left engine mixture input	0 to 99	2	1	4
45	Left prop rpm input	0 to 99	2	1	4
46	Pilot's Right Throttle Input	0 to 99	2	1	4
47	Right engine mixture input	0 to 99	2	1	4
48	Right prop rpm input	0 to 99	2	1	4
49	Left prop rpm	rpm	4	0	4
50	Right prop rpm	rpm	4	0	4
51	Flap Deflection (percent)	0-1	2	1	4
52	Flap Deflection input	deg	2	1	4
53	Elevator trim activation on the yoke	encoded	1	0	1
54	Landing gear selector	encoded	1	0	1
55	Cowl flap selector (1)	0 - 1	2	0	2
56	Cowl flap selector (2)	0 - 1	2	0	2
57	Outside visibility as reported at present location	nm	2	1	4
58	Lowest cloud layer as reported at present location	ft msl	5	0	5
59	Lowest cloud layer coverage at location	1/8	1	0	1
60	Event marker on yoke (squawk)	encoded	1	0	1
61	OBS 2 From/To indication tuned to NAV2	encoded	1	0	1
62	VOR OBS Course Selector tuned to NAV2	deg	3	1	5
63	CDI2 VOR deviation indication tuned to NAV2	deg	2	1	4
64	NDB needle bearing to station tuned to ADF	deg	3	1	5

Encoded values:

Item	Descr.	size	syntax
27	Flight Director	1	0=off, 1=on
31	ILS Glideslope CDI NAV1	5	Float from −1 (full below deflection too low) to +1 (full deflection too high)
32	Glideslope Valid Nav 1	1	1 valid, 0 invalid
34	Localizer Validity Nav 1	1	1 valid, 0 invalid
53	Elevator Trim activation	1	0 neutral, -1 trim down, +1 trim up
54	Landing gear selector	1	0 down, 1 up
60	Squawk	1	0 off, 1 pressed
61	OBS2 From/To	1	0 from, to 1, off 2

Comments:

- localizer full CDI deflection is 5 dots and typ. 2.5 degrees

- glideslope full CDI deflection is typ. 0.7 degrees

4.2   Data record V3

```
float    fUpdateCounter;  // update counter
float    fAlpha;          // Aircraft Angle of Attack [deg]
float    fBeta;           // Aircraft Sideslip Angle [deg]
float    fGamma;          // Aircraft Flight Path Angle [deg]
float    fGroundSpeed;    // Aircraft Ground Speed [kts]
float    fIAS;            // Aircraft Indicated Airspeed [kts]
float    fDIAS;           // Aircraft Indicated Airspeed Change Rate [kts/sec]
float    fLongAcc;        // Aircraft Longitudinal acceleration along flight path
                                [9.81 m/s^2 or g]
float    fMagHdg;         // Aircraft Magnetic Heading [deg]
float    fTrueHdg;        // Aircraft True Heading [deg]
float    fMagTrack;       // Aircraft Magnetic Track Angle [deg]
float    fTrueTrack;      // Aircraft True Track Angle [deg]
float    fPressAlt;       // Aircraft Pressure Altitude (as indicated on instrument)
                           [ft]
float    fRadioAlt;       // Aircraft Radio Altimeter Altitude (if installed) [ft]
float    fTAS;            // Aircraft True Airspeed [kts]
float    fVS;             // Aircraft Vertical Speed [ft/min]
float    fQNH;            // Baro Setting, In of Hg (as set on ALT instrument) [in hg]
float    fDME;            // DME – Distance from Nav Device [nm]
float    fFlapDeflection; // Flap Deflection [deg]
float    fFDState;        // Flight Director (FD) Status [encoded]: 0=off, 1=on
float    fFDPitch;        // FD Pitch Command (Degs) [deg]
float    fFDRoll;         // FD Roll Command (Degs) [deg]
float    fGLoad;          // Normal (vertical) G-Load [9.81 m/s^2 or g]
float    fGSDeviation;    // ILS Glideslope CDI from station tuned into NAV1 [-1..+1]
float    fGSValid;        // Glideslope Validity on Nav1 [encoded]: 0 invalid, 1 valid
float    fLocDeviation;   // ILS Localizer CDI from station tuned into NAV1 [dots]
float    fLocValid;       // ILS Localizer Validity on Nav1[encoded]: 0 invalid, 1
                           valid
float    fWindDirection;  // Prevailing Wind (true) Direction at Aircraft Altitude
                            [deg]
float    fWindMagnitude;  // Prevailing Wind Magnitude at Aircraft Altitude [kts]
float    fHdg;            // Aircraft true Heading [deg]
float    fPitch;          // Aircraft Pitch Attitude [deg]
float    fRoll;           // Aircraft Roll Angle [deg]
float    fLatitude;       // Aircraft Latitude (WGS-84) [deg]
float    fLatitudeP1;     // Aircraft Latitude (WGS-84) [deg] part one of double
float    fLatitudeP2;     // Aircraft Latitude (WGS-84) [deg] part two of double
float    fLongitude;      // Aircraft Longitude (WGS-84) [deg]
float    fLongitudeP1;    // Aircraft Longitude (WGS-84) [deg] part one of double
float    fLongitudeP2;    // Aircraft Longitude (WGS-84) [deg] part two of double
float    fAltMSL;         // Aircraft altitude above MSL [ft]
float    fAltAGL;         // Aircraft altitude above AGL at current location [ft]
float    fLongInput;      // Pilot's Longitudinal input [-1 to 1]
float    fLatInput;       // Pilot's Lateral Input [-1 to 1]
float    fDirInput;       // Pilot's Directional Input [-1 to 1]
float    fPilotLeftBrake; // Pilot's Left Brake Input [0 to 1]
```

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```
    float   fPilotRightBrake;// Pilot's Right Brake Input [0 to 1]
    float   fPilotLeftThrottle; // Pilot's Left Throttle Input [0 to 1]
    float   fPilotLeftMix;   // Pilot's Left engine mixture input [0 to 1]
    float   fPilotLeftRPM;   // Pilot's Left prop rpm input [0 to 1]
    float   fPilotRightThrottle;// Pilot's Right Throttle Input [0 to 1]
    float   fPilotRightMix;  // Pilot's Right engine mixture input [0 to 1]
    float   fPilotRightRPM;  // Pilot's Right prop rpm input [0 to 1]
    float   fLeftRPM;        // actual left RPM [in /min]
    float   fRightRPM;       // actual right RPM [in /min]

    float   fFlapPos;        // Flap deflection input [deg]
    float   fElevTrim;       // Elevator trim activation on the yoke [encoded]:
                             // -1 trim down; 0 no trim input; +1 trim up
    float   fGear;           // Landing gear selector [encoded]:  0=down, 1=up
    float   fCowlFlaps1;     // Cowl flap selector (1) [0 to 1]
    float   fCowlFlaps2;     // Cowl flap selector (2) [0 to 1]
    float   fYawRate;        // yaw change rate [deg/sec]
    float   fPitchRate;      // Pitch Angle Rate [deg/sec]
    float   fRollRate;       // Roll Angle Rate [deg/sec]
    float   fVisibility;     // Outside visibility as reported at present loc [nm]
    float   fCloudCeiling;   // Lowest cloud layer base as reported at present loc [ft]
    float   fCloudCoverage;  // Lowest cloud layer coverage as reported at loc [1/8]
    float   fSquawk;         // Event marker activation on yoke (squawk) [encoded]: 0
                                off, 1 click
    float   fOBS2FromTo;     // OBS 2 From/To indication tuned to NAV2 [encoded]:  from
                                0, to 1, 2 off
    float   fCDI2Select;     // VOR OBS Course Selector tuned to NAV2 [deg]
    float   fCDI2;           // CDI2 deviation indication tuned to NAV2 [dots]
    float   fNDB;            // NDB needle bearing to station tuned to ADF [deg]
```

4.3 Sample Logfile entry V3

```
TIMESTMP  ALPHA   BETA  GAMMA  ACHDG   PITCH   ROLL  YRATE  PRATE  RRATE   MHDG   THDG MTRACK TTRACK
28294.36   3.50   0.00   0.00 160.00    0.50   0.00   0.00   0.00   0.00 164.00 160.00 164.00 160.00
28294.36   3.50   0.00   0.00 160.00    0.50   0.00   0.00   0.00   0.00 164.00 160.00 164.00 160.00


      LAT        LON   MSL    AGL    GS    IAS   IASR    TAS     VS PRESS  RALT   LACC   GLOD S
35.446499 -82.546440  2167   2167   0.0    0.0    0.0    0.0      0  2169     0   0.00   0.00 1
35.446499 -82.546440  2167   2167   0.0    0.0    0.0    0.0      0  2169     0   0.00   0.00 1

FDPIT FDROL    DME  ILSGS1 ILSLOC1   QNH WND WNDMA LON LAT DIR   LB   RB   LT   LM   LR   RT   RM   RR
 0.00  0.00  -99.0   0.00 1  0.00 1 29.92   0   0.0   0   0   0  0.0  0.0  0.0 99.0 99.0  0.0 99.0 99.0
 0.00  0.00  -99.0   0.00 1  0.00 1 29.92   0   0.0   0   0   0  0.0  0.0  0.0 99.0 99.0  0.0 99.0 99.0

LRPM RRPM FLPD FLPI T G C1 C2  VIS  CEIL C S O OBSSL CDI2   NDB
 669  661  0.0  0.0 0 0  0  0  8.1     0 0 0 2   0.0 -1.0  -1.0
 669  661  0.0  0.0 0 0  0  0  8.1     0 0 0 2   0.0 -1.0  -1.0
```

5   PROTOCOL "SYNTHETIC VISION"

This protocol is as a special data output version implemented for the Synthetic Vision Group at NASA. The data is sent using the Socketman toolkit (see http://web.media.mit.edu/~kbrussel/SocketMan/) . A sample receiver for this output channel is included in the receiver installer ("SampleReceiverSV.EXE").

Sample configuration file entry:

```
[PROTOCOL_CH1]

DataType = VersionSVV
CommType = EthernetClient
Port=13888
IP=192.168.0.103
SyncRate =30.000000
```

5.1   Data record "Synthetic Vision"

```
float UpdateCounter;
float TcasUpdateCounter;
float LatitudeDegree;          // Latitude in decimal degrees
float LongitudeDegree;         // Longitude in decimal degrees
float MslAltitudeFeet;         // MSL altitude in feet
float GpsAltitudeFeet;         //gps height above ellipsoid in feet
float RadarAltitudeFeet;       // Radar (height above ground) altitude in feet
float PitchDegree;             // A/C pitch in degrees
float RollDegree;              // A/C roll in degrees
float TrueHeadingDegree;       // A/C true heading in degrees
float TrueTrackDegree;         // A/C true track in degrees
float MagneticHeadingDegree;// A/C magnetic heading in degrees
float WindSpeedKnot;           // Wind speed in knots
float WindDirectionDegree;     // Wind direction in degrees
float TrueAirspeedKnot;        // True airspeed in knots
float IndicatedAirspeedKnot;// Indicated airspeed in knots
float CommandedAirspeedKnot;// Commanded airspeed in knots
float GroundSpeedKnot;         // Ground speed knots
float VerticalSpeedFpm;        // Vertical speed (hdot) in ft/min
float StallSpeedKnot;          // Stall speed in knots
float VminKnot;                // Vminimum in knots
float BetaDegree;              // Side slip in degrees
float GammaDegree;             // Flight path angle in degrees
float CommandedGammaDegree;  // Commanded Flight path angle in degrees
float LocalizerDot;            // Approach lateral error in dots
float GlideSlopeDot;           // Approach vertical error in dots
float LongAccelerationFps2;  // Longitudinal accerleration in Fps2
float DeclutterSwitchBool;   // State of declutter switch (1.0 = pressed)
float UtcTimeSecond;           // Utc time in seconds since midnight
```

```
float NumberOfTargets;       // Number of TCAS targets detected
float ScreenBlanking;        // blanks screen if greater or equal to 1.0
```

6 VERSION HISTORY

Version	Date	Change
V 2.0.2	6.Aug.2001	
V 3.0.B1	24.Sept.2001	
V 3.0.2	9.Oct.2001	communication tested, released
V 3.0.3	12.Oct.2001	used utSocketBuffer instead of utBuffer
V 3.0.4	19.Oct.2001	force direct UDP, message box for testing
V 3.0.5	24.Oct.2001	automatic logile naming
V 3.0.6	26.Oct.2001	localizer, glideslope deviation in dots, not degrees
V 3.0.7	1.Nov.2001	fixed CDI2 and nav validity problems
V 3.0.8	26.Nov.2001	back to original Socketman transmission
V 3.0.9	28.Nov.2001	minor logfile path problem fixed
V 3.0.10	4.Dez.2001	GS CDI fix: full GS deflection clipped to +/-1.0
V 3.0.11	24.Jan.2002	restructuring: more flexible configuration, multiple output channels
V 3.0.12	20.Sept.2002	minor changes in V3: renamed fRadioAlt to fRadarAlt, item 27/fFDState corrected
V 4.0.0	1.Oct. 2002	Protocol Version 4 released
V 4.0.1	4.Nov. 2002	reactivated Synthetic Vision Group output protocol, added sample SV-receiver
V 4.0.2	29.Nov.2002	reactivated NASA NMEA output protocol
V 4.1.0	26.Mai.2003	fixed/added accelerations in the aicraft system and aerodynamic system e(additions in version 4 only); new company name